



Forage Research in Texas

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 Workers: Billy Hipp and
 James Read

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(INFLUENCE OF) NITROGEN ON YIELD AND PROTEIN PRODUCTION

BY KLEINGRASS AND RENNER LOVEGRASS

OBJECTIVES:

(1) To determine the influence of nitrogen on herbage yield and protein production by Kleingrass and Renner lovegrass. (2) To estimate N and moisture use efficiency by the two forage grass varieties.

PROCEDURE:

Nitrogen studies were conducted during 1978 on Kleingrass and Renner lovegrass located at Dallas, Tx. Soil type at the experimental site was Austin silty clay. Plot size was 1.8 x 6.8 m and treatments were replicated 2 or 3 times. Nitrogen treatments on Kleingrass were: (1) no N, (2) 112 kg N/ha applied on March 16, and (3) 112 kg N/ha applied on March 16 and an additional 56 kg/ha applied after the first and second clippings (224 total). Treatments on Renner lovegrass were: (1) no N, (2) 112 kg N/ha applied on March 16, and (3) 56 kg N/ha after the first and second clipping (112 total). The N source was ammonium nitrate and all plots received 39 kg P/ha on March 16. A flail type harvester was used to cut 3.4 m² from each plot on three clipping dates. Forage was weighed green and subsamples taken for oven dry weights and protein determinations. Rainfall distribution during the experimental period is given in Table 1.

RESULTS AND DISCUSSION:

Forage yield of Kleingrass was increased at each of the three harvest dates by application of 112 kg N/ha (Table 2), however, an additional 56 kg N/ha after the first and second harvest did not produce additional yield increases. Total yields of dry Kleingrass forage were 4,977 and 11,166 kg/ha for the unfertilized and 112 kg N, respectively. Similar results were obtained from N application to Renner lovegrass. Total forage produced as a result of 112 kg N/ha applied to Renner lovegrass was 9936 kg/ha (Table 3). Split application of N resulted in slightly higher yields late in the season but total yields were about the same for split and single application. Yields might have been higher from the split application treatment if the first application had been made before the first harvest. This is indicated by the yield response to N at the first clipping date.

Protein production by both varieties was increased by N application (Tables 4 and 5) and was influenced more than yield because N increased yield while increasing protein concentration in plants.

Recovery (based on percent N in forage) of 112 kg N applied/ha was 67 and 79% by Renner lovegrass and Kleingrass, respectively (Table 6). Recovery from 224 kg N/ha applied to Kleingrass was only 52%.

The need for adequate N for maximum utilization of available rainfall is indicated in Table 7. Approximately twice as much forage/cm of rainfall was produced by both varieties with the application of N.

TABLE 3

INFLUENCE OF N ON FORAGE YIELD OF RENNER LOVEGRASS AT DALLAS, TX

kg N/ha applied	Apr. 26	kg forage/ha Aug. 11	Oct. 2	Total
0	2281	1878	1088	5247
112	3017	5087	1832	9936
56 + 56**	2290	4715	2417	9422

** 56 kg/ha after 1st and 2nd clipping

TABLE 4

INFLUENCE OF N ON PROTEIN PRODUCTION BY KLEINGRASS AT DALLAS, TX

kg N/ha applied	May 9	kg protein/ha Aug. 11	Oct. 2	Total
0	120	97	56	273
112	489	205	133	827
112 + 56 + 56***	507	326	168	1001

*** 112 kg/ha in March and 56 kg/ha after 1st and 2nd clipping

TABLE 5

INFLUENCE OF N ON PROTEIN PRODUCTION BY RENNER LOVEGRASS AT DALLAS, TX

kg N/ha applied	Apr. 26	kg protein/ha Aug. 11	Oct. 2	Total
0	153	51	58	262
112	396	209	119	724
56 after 1st and 56 after 2nd clipping (112 total)	178	123	210	510

TABLE 1

PRECIPITATION DURING 1978 AT TAES - DALLAS

Month	cm	inches
January	3.81	1.50
February	7.67	3.02
March	5.66	2.23
April	3.96	1.56
May	18.57	7.31
June	1.73	0.68
July	1.83	0.72
August	9.40	3.70
September	4.01	1.58
October	0.76	0.30
November	9.07	3.57
December	3.15	1.24
	69.62	27.41

TABLE 2

INFLUENCE OF N ON FORAGE YIELD OF KLEINGRASS AT DALLAS, TX

kg N/ha applied	May 9	kg forage/ha Aug. 11	Oct. 2	Total
0	1367	2863	747	4977
112	4090	5490	1586	11166
112 + 56 + 56*	3833	5908	1076	10817

* 112 kg/ha in March and 56 kg/ha after 1st and 2nd clipping.

TABLE 6

RECOVERY OF APPLIED N BY KLEINGRASS AND RENNER LOVEGRASS AT DALLAS, TX

kg N/ha applied	Kleingrass		Renner lovegrass	
	kg N/ha recovered	% efficiency	kg N/ha recovered	% efficiency
0	44		41	
112	132	79	117	67
112 + 56 + 56*	160	52		
0 + 56 + 56**			82	37

* 112 kg/ha in spring and 56 kg/ha after 1st and 2nd clipping

** 56 kg/ha after 1st and 2nd clipping

TABLE 7

INFLUENCE OF NITROGEN ON MOISTURE UTILIZATION BY KLEINGRASS
AND RENNER LOVEGRASS AT DALLAS, TX

	kg forage/ha/cm of rainfall			
	<u>May 9 - Aug. 11</u>		<u>Aug. 12 - Oct. 2</u>	
	<u>No N</u>	<u>112 N</u>	<u>No N</u>	<u>112 N</u>
Kleingrass	123	236	108	229
Renner lovegrass	81	219	157	264

Average of No N = 117 kg forage/ha/cm

Average of 112 N = 237 kg forage/ha/cm